Pearson BTEC Level 3 Nationals Certificate

Please check the examination details below before entering your candidate information

Candidate surname	Other names

Centre Number | Learner Registration Number

Time 1 hour 30 minutes

Paper reference **31524H**

Sport

UNIT 1: Anatomy and Physiology

You do not need any other materials.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and learner registration number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*

Information

- The total mark for this paper is 80.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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Section A: The Skeletal System for Sports Performance

Answer ALL questions. Write your answers in the spaces provided.

1 Identify the bone type for each bone in **Table 1**. An example has been given.

Bone	Bone type
Vertebrae	Irregular
Femur	A – .....
Carpals	B – .....
Ribs	C – .....
Patella	D – .....

Table 1

(Total for Question 1 = 4 marks)

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2 (a) State the movement that occurs at a pivot joint.

(1)

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(b) State the joint movements happening in the following sporting actions.

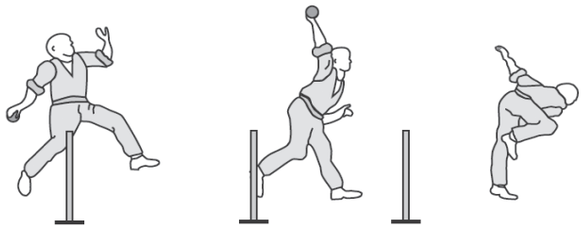

Figure 1

(i) The shoulder of a cricket player when bowling overarm, as shown in **Figure 1.**

(1)

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Source: © UfaBizPhoto/Shutterstock

Figure 2

(ii) The elbow of a gymnast when holding a handstand, as shown in **Figure 2**.

(1)

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(Total for Question 2 = 3 marks)

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3 Name **three** functions of the skeleton.

1 .....

2 .....

3 .....

(Total for Question 3 = 3 marks)

Kamal is a long jumper.

4 Explain why the articular cartilage in the knee is important when performing a long jump.

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(Total for Question 4 = 3 marks)

TOTAL FOR SECTION A = 13 MARKS

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PLEASE TURN OVER FOR QUESTION 5

SECTION B: The Muscular System for Sports Performance

Answer ALL questions. Write your answers in the spaces provided.

Muscles work together to produce movement. Muscles have different roles within antagonistic muscle actions.

5 Identify which role is being described in **A–D** in **Table 2**.

Description	Role of a muscle
A muscle that is responsible for the movement taking place, the 'prime mover'.	A – .....
A muscle or group of muscles that work with the active muscle to generate movement.	B – .....
The muscle that relaxes to allow the movement to happen.	C – .....
The muscle that acts as a stabiliser to stop any unwanted movement of the joint.	D – .....

Table 2

(Total for Question 5 = 4 marks)

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6 (a) Penny is a gymnast. When she is doing her beam routine she uses different types of muscular contraction.

(i) Describe a concentric contraction **and** give an example of when it would be used on the beam.

(2)

(ii) Describe an isometric contraction **and** give an example of when it would be used on the beam.

(2)

(iii) Describe an eccentric contraction.

(1)

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During the vault Penny will use mainly type IIx muscle fibres.

Source: © StockphotoVideo/Shutterstock

Figure 3

(b) Explain why type IIx muscle fibres are used during the vault.

(2)

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When Penny is doing her floor routine the blood supply to her muscles increases.

(c) Explain the impact of an increased blood supply on Penny's muscles.

(3)

(Total for Question 6 = 10 marks)

TOTAL FOR SECTION B = 14 MARKS

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SECTION C: The Respiratory System for Sports Performance

Answer ALL questions. Write your answers in the spaces provided.

7 Complete **Table 3** by naming each lung volume described (**A–E**).

Description	Lung Volume
The air that remains in the lungs after maximal expiration.	A – .....
The maximum amount of air that can be forced out of the lungs after maximum inhalation.	B – .....
The volume of air passing in or out of the lungs in 60 seconds.	C – .....
The volume of air in the lungs after maximal inhalation.	D – .....
The amount of air breathed in or out during a normal breath.	E – .....

Table 3

(Total for Question 7 = 5 marks)

8 Describe **two** adaptations of the respiratory system to exercise.

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2 .....

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(Total for Question 8 = 4 marks)

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Kirsty is a netball player who is going to start playing in a match.

9 Analyse how the mechanisms of breathing for **inspiration** and **expiration** change from **rest to exercise** and the impact that this has on performance.

(Total for Question 9 = 6 marks)

TOTAL FOR SECTION C = 15 MARKS

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SECTION D: The Cardiovascular System for Sports Performance

Answer ALL questions. Write your answers in the spaces provided.

10 Describe the role of the bicuspid valve in the cardiac cycle.

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(Total for Question 10 = 2 marks)

Figure 4 is a diagram showing the nervous control of the cardiac cycle.

11 (a) Identify the structures labelled **A** and **B**.

(2)

A

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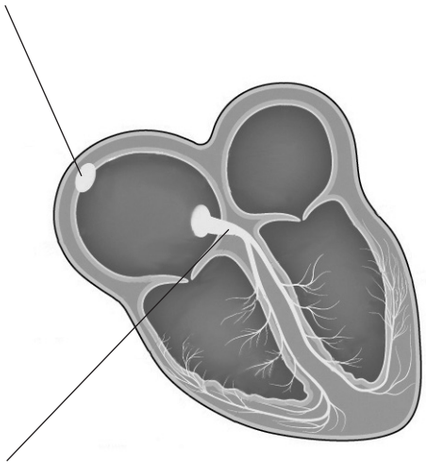

B

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Source: © Blamb/Shutterstock

Figure 4

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(b) Describe the role of the atrioventricular node (AVN).

(2)

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(Total for Question 11 = 4 marks)

12 State **two** functions of plasma.

1 .....

2 .....

(Total for Question 12 = 2 marks)

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Heidi is a boxer who has been cut on her eyebrow. One of the many functions of the cardiovascular system is to clot blood.

13 (a) Describe how blood is clotted.

(3)

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During the boxing match Heidi relies on her cardiovascular system to get her to the final rounds of the match.

(b) Analyse the flow of blood as it leaves the left ventricle and returns back to the lungs and how this helps Heidi last the whole boxing match.

(6)

(Total for Question 13 = 9 marks)

TOTAL FOR SECTION D = 17 MARKS

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SECTION E: Energy Systems for Sports Performance

Answer ALL questions. Write your answers in the spaces provided.

14 Complete **Table 4** by giving the recovery time for each energy system (**A–C**).

Energy system	Recovery time
ATP-PC	A – .....
Lactate	B – .....
Aerobic	C – .....

Table 4

(Total for Question 14 = 3 marks)

15 Describe how the ATP-PC system resynthesises ATP.

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(Total for Question 15 = 4 marks)

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Juan is a footballer.

16 Assess how each of the **three** energy systems contribute to Juan's football performance.

(6)

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(Total for Question 16 = 6 marks)

TOTAL FOR SECTION E = 13 MARKS

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PLEASE TURN OVER FOR QUESTION 17

SECTION F: Interrelationships between Body Systems for Sports Performance.

Answer ALL questions. Write your answers in the spaces provided.

Sunita is a rugby player. She has completed a pre-season training plan resulting in long-term adaptations to her cardiovascular and energy systems.

17 Analyse how the adaptations to Sunita's cardiovascular and energy systems will impact on her rugby performance.

(8)

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(Total for Question 17 = 8 marks)

TOTAL FOR SECTION F = 8 MARKS
TOTAL FOR PAPER = 80 MARKS

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